

# SCIENCE

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Chemical compounds may contaminate surface and ground waters, thereby affecting public health, causing the loss of agricultural, municipal, and recreational use, and exposing Reclamation to potential regulatory liability. Reclamation water systems experience a variety of naturally-occurring and anthropogenic chemical contamination problems, such as: contaminated irrigation return flows; acid mine drainage; evaporation concentration of contaminants in wetlands and other drainage basins; concentration problems from water reuse; pollution from watershed processes; internal processes in reservoirs and streams that mobilize contaminants; and other environmental chemistry problems caused by land use patterns and pollution. This study supports environmental chemistry investigations into processes occurring in stream and wetland sediments. ER.99.27 is accomplished through collaborative investigations where contaminant origins, transformations, and transport - and the associated chemical processes - are issues for Reclamation's water resource management mission. This program builds on studies commissioned by collaborative partners, developed under project ER.99.21 and its predecessors.

The objectives for ER.99.27 this fiscal year were to:

- continue collaborative studies with Charles Liston regarding the fate and transformation of agricultural chemicals and other contaminants at the Tracy Fish Collection Facility;
- initiate collaborative studies with Mark Nelson regarding chemical processes in the hyporheic zone of Lake Creek, near Leadville, Colorado;
- begin collaboration with Rick Roline regarding movement and redox transformations in artificial wetland sediments; and
- publish results of a study investigating acid mine drainage at California Gulch, Leadville, Colorado, during a spring snowmelt runoff event. The Tracy and California Gulch work was previously funded by WATR and EPA Region VIII Superfund Remedial Investigation at California Gulch Operable Unit 6, Leadville Colorado.
- A report summarizing available chemistry data and pesticide application data near the Tracy Fish Collection Facility is in final layout and nearing publication. The Tracy Fish Facility Improvement Program (TFFIP) is now almost completely supporting activities on this investigation. A calibration program for automated semi-continuous water quality parameter (pH, temperature, conductivity, dissolved oxygen, and depth) measurements has been implemented. A sampling program for organic and trace element contaminants has been implemented using computer-controlled time-integrated preconcentration samplers using solid phase extraction and open

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scan mass spectrometry.

- Several sets of water and adsorptive surface samples collected from hyporheic pots installed in Lake Creek have been processed through the TSC chemistry lab, and data have been analyzed.
- Literature searches have been initiated to enable future investigations of fate and transformation of selenium and mercury in artificial wetlands.
- A manuscript summarizing the results of the snowmelt runoff chemistry in California Gulch OU-6 was revised and submitted for copy review and editing.

The partners for the various research tasks are as follows: (1) Charles Liston, Program Manager, Tracy Fish Facility Improvement Program; Ron Brockman, John Fields, and Lee Mao, Mid-Pacific Regional Office, Sacramento California; (2) Mark Nelson, Principal Investigator for Stream and River Ecology research program; (3) Rick Roline and various regional cooperators using artificial wetlands to treat water quality problems; and (4) Ron Pearson, Cal Gulch OU-6 project geologist, and Region VII EPA.

Craft, C. Douglas, Lee Mao, John Fields, and Bruce Moore. October 1999. The Chemistry and Water Quality at the Tracy Fish Collection Facility, Tracy Fish Collection Facility Studies, California, Volume 9.

Craft, C. Douglas, and Ron Pearson. 1999. Chemistry of Acid Mine Drainage during the 1995 Snowmelt Runoff Event, California Gulch, Colorado. TSC R-Report. (Also to be submitted to Environmental Geochemistry and Health as a journal manuscript.)